Open Knowledge Fuelling Open Innovations in Public-Private Collaboration

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Abstract: Despite recognizing the importance of knowledge in innovation, the link between publicly available knowledge and innovation remains unclear. A unified view of open innovation (OI) and the public sector's knowledge ecosystem, along with public-private collaboration, is essential. Successful knowledge-based innovation requires functional systems to overcome barriers in open knowledge and innovation. This paper emphasizes the need for consideration of open innovations converted by private sector from public sector knowledge sources. Empirical study consisted of two exemplary cases is carried out to understand how the private sector can benefit from public knowledge.

1 INTRODUCTION

Public and private sectors face significant potential but also challenges in open innovation (OI) fueled by open knowledge. For example, there are often insufficient resources for processing the different kinds of publicly available knowledge sources (Luna-Reyes et al. 2019; Begany and Martin 2020). Additionally, access to knowledge can be limited (Hellberg and Hedström 2015; Smith, Ofe, and Sandberg 2016).

Although various forms of processes have been designed to describe the possibilities of OI (e.g., Mergel 2015; Smith and Sandberg 2018; Mu and Wang 2020), it remains unclear whether exchange of open knowledge truly benefits OI. Key questions include whether open knowledge offers societal or economic value and to whom this value accrues: the public sector, citizens, or other stakeholders, including the private sector.

Open knowledge sources are a potential base for innovations at the public-private interface. However, the benefits of opening public knowledge sources are two-fold. Firstly, opening up knowledge sources for companies and knowledge developers offers public knowledge branding. Companies do not expect to obtain rapid innovations via open knowledge. Secondly, there are challenges in knowledge utilization, such as knowledge consistency and integration, trustworthiness of the knowledge, or access rights. Nevertheless, high technology and artificial intelligence are expected to produce innovations in the coming years.

OI can occur between public-public actors, public-citizens, public-private actors (Mu and Wang 2020), and private-private actors. There is a noted risk in OI with private actors in the public sector due to fears that the innovation process results may benefit the private market more than offering public value (Hartley et al. 2013). Therefore, new thinking about OI is needed in the public sector to create frameworks for public-private open knowledge cooperation that benefits all parties of the value triangle: the public sector, private sector, and the customer. It is essential to identify suitable cooperation partners, actualize the identified drivers, and obtain transaction flows in OI processes in the private sector (e.g., Torfing, Sørensen, and Røiseland 2019).

The infrastructure and content use possibilities of public knowledge frameworks have been examined

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both practically and academically (Conradie and Choenni 2014; Charalabidis, Alexopoulos, and Loukis 2016; Ham, Koo, and Lee 2019; Smith and Sandberg 2018; Jamieson, Wilson, and Martin 2019; Luna-Reyes et al. 2019; Pereira et al. 2017). Researchers have considered the barriers and challenges of open knowledge utilization, focusing on knowledge platforms, the knowledge itself, and human-technology interaction in the innovation process. However, the drivers of open knowledge have received less attention.

Although technical in nature, the knowledge ecosystem also contains social aspects. A knowledge ecosystem is built on actors, roles, relationships, and resources that aim to exchange, produce, or consume knowledge together (Oliveira, Lima, and Lóscio 2019). When opening platforms, knowledge, or implementing new OI and co-creation practices in an organization, leadership and teams face new challenges. These include internal effects (e.g., culture, norms) and external effects (e.g., customers, other stakeholders) (Altman and Tushman 2017). Actors in the ecosystem have different interests, such as focusing on customer and market needs or accumulating knowledge in the ecosystem, which need to be considered in platform or knowledge ecosystem management (Wareham, Fox, and Giner 2014). Additionally, actors have varying levels of competence, knowledge, and maturity to operate in the platform or utilize the knowledge, and they need to identify their roles in the ecosystem.

This paper emphasizes the public sector's role as a context, suggesting the need to explore opportunities for private market participation in service development. The literature has identified several challenges to using open knowledge and developing open knowledge-driven innovations. These challenges can be categorized as technical design and knowledge quality or integration, knowledge management policy and legal issues, financial backing for open knowledge programs, or organizational and cultural contexts. Smith and Sandberg (2018) argue that challenges in open knowledge operation processes can affect the way knowledge is used and the various stages of its implementation. When platforms lack identification requirements, anonymity in knowledge use poses a challenge (Begany and Martin 2020). Therefore, this study seeks to explore the potential of public knowledge to spur open innovation via public-private partnerships.

2 EMPIRICAL CASE EXEMPLARS

To highlight the value of open knowledge in fostering open innovation via public-private collaboration, two prime case studies based in Finland were examined. Lakivahti, the first case exemplar, uses secondary data from Sitra (www.sitra.fi). The second exemplar case, Lupapiste.fi, is built upon an empirical study from Jussila et al. (2017), supplemented by updated secondary data from Kuntaliitto (www.kuntaliitto.fi).

2.1 Case 1: Lakivahti Service for Citizen Participation in Legislative Processes

Despite Finland's reputation for high institutional trust, a democratic deficit persists, leaving its citizens feeling alienated from the legislative process. Addressing this challenge, Sitra (Finland's innovation fund) launched the "Renewing Decision-Making" initiative, using the Lakivahti project to showcase how digital innovation and cross-sector collaboration strengthen democratic participation. Lakivahti strives for transparent, accessible, and participatory legislative processes. Citizens can use this digital service to monitor legislative progress, receive alerts on relevant topics, and participate in the lawmaking process. It simplifies and clarifies the legislative process, much like a "parcel tracking system," especially engaging young people who find politics opaque.

Lakivahti resulted from collaboration among the public, private, and plural sectors. Legislative content came from government institutions, technological expertise from Gofore, and youth perspectives from Allianssi. This user-centered solution resulted from a collaborative approach that fostered mutual learning.

Open knowledge played a crucial role in three ways during the collaborative development of the innovative solution and they are: 1) Transparency and Accessibility: Legislative initiatives were presented clearly and structured, empowering citizens to engage confidently; 2) Data-Driven Personalization: AI filtered and personalized knowledge, ensuring users received relevant updates, increasing engagement and reducing explicit knowledge overload; and 3) User Insight and Design: User research, especially among young people, shaped the service's features, highlighting the importance of iterative design and continuous user testing.

The Lakivahti case illustrates that digital technologies can strengthen established democratic

bodies by fostering more open and inclusive legislative processes. In line with worldwide open government and civic tech movements, this contributes to the expanding "GovTech" field, leveraging technology for better public services and citizen engagement. Lakivahti shows how digital innovation, inclusive design, and strategic partnerships can renew democratic participation. A model for digital-age democracies is offered through the simplification of their legislative processes. With complex challenges facing societies, inclusive, transparent, and responsive governance is now more critical than ever, and Lakivahti offers a powerful example of how thoughtful design and collaboration can address this need.

2.2 Case 2: Lupapiste Service for Construction Permissions

Historically, building permit processes have been slow, complex, and overly reliant on paper-based systems. The impact of these inefficiencies extends beyond administration to investment timelines, construction efficiency, and citizen satisfaction. Finland tackled this challenge by creating Lupapiste.fi, a digital platform managing all building permit processes. Lupapiste demonstrates the significant societal value generated through strategic use of open knowledge and collaborative efforts between public and private sectors.

To streamline and digitize building permits in Finnish municipalities, the Lupapiste initiative was created. A unified digital workspace for real-time interaction, application submission, progress tracking, and communication between builders, designers, and authorities was the target. The service sought to lessen administrative tasks, enhance transparency, and expedite decision-making.

The development of Lupapiste involved a wide range of actors. The technical implementation and service design were led by the Finnish company Cloudpermit Oy, while over 200 municipalities contributed their expertise and practical needs. Notably, the City of Helsinki coordinated a joint development project involving 26 municipalities. This collaboration was hands-on and iterative. Local building control authorities participated in workshops, pilots, and continuous feedback loops. This grassroots-level engagement ensured that the service was not only technically functional but also aligned with real-world workflows and user expectations.

The central role of knowledge in Lupapiste's development and operation was threefold: 1) Knowledge as the Foundation of Design: The service was built on extensive user research. Municipal officials, builders, and designers provided insights that shaped the platform's interface, logic, and features. The user-driven approach guaranteed the service met real needs and addressed actual problems. 2) Knowledge as the Core of the Service: Lupapiste functions as a centralized knowledge hub. It brings together all documents, statements, and decisions linked to a permit application. With real-time access to shared codified knowledge, errors are reduced, processing is faster, and transparency is improved for all, and 3) Knowledge for Decision-Making and Development: The platform continuously generates content on process durations, bottlenecks, and user behavior. Municipalities can use this content to streamline internal processes, optimize resource allocation, and contribute to national policy.

Over 200 Finnish municipalities now use Lupapiste digital service, resulting in much faster permit processing. In 2022, the service earned the title of "Digital Service of the Year," and its global extension, Cloudpermit, has grown into North America, supporting over 200 regions. The influence of Lupapiste surpasses the scope of individual permits. Streamlined permitting accelerates investments, increases construction, and creates jobs. Digital transformation has boosted transparency, cut manual labor, and improved customer happiness.

The Lupapiste example shows how co-creation, digital innovation, and knowledge utilization can reshape public services. User-centric development, driven by strong municipality-private developer partnerships, is the key to its success. More than just information, explicit knowledge forms the essential structure of design, operation, and continuous improvement. Lupapiste exemplifies how effective public-private partnerships, utilizing shared knowledge, can achieve scalable, impactful, and internationally relevant results in public sector digital transformation.

3 RESULTS

The field of open knowledge presents complex, multi-dimensional challenges and opportunities. Infrastructure and content use possibilities of public knowledge frameworks have been examined practically and academically (Conradie and Choenni 2014; Charalabidis, Alexopoulos, and Loukis 2016; Ham, Koo, and Lee 2019), management practices and policies (Smith and Sandberg 2018; Jamieson, Wilson, and Martin 2019; Luna-Reyes et al. 2019)

and among value-creation networks (Pereira et al. 2017).

Studies of OI and public sector open knowledge ecosystems typically ignore their interconnection. This study emphasises that OI is fundamentally rooted in knowledge ecosystems and open knowledge utilization, and that the relationships between the various participants within these ecosystems are not a primary concern and only two partners are required to create commercial innovation. Various open knowledge ecosystem models have been created to demonstrate network development (Dawes, Vidiasova, and Parkhimovich 2016; Bonina and Eaton 2020). Ecosystems are not directly monetizable by private firms, but the actors involved can create innovation and new business models via partnerships within the ecosystem.

The other question is whether the public sector is willing to divide the control of the knowledge to enable the knowledge's further use for commercial value. This dilemma appeared in the selected literature business models as well, which considered the economic benefits of value obtained from the public sector rather than the private sector business side (Feller, Finnegan and Nilsson 2011; Zeleti and Ojo 2019). Business models in the public sector may be based more on value creation for citizens (e.g. promoting governmental program implementation or offering services) that are non-economic, whereas private sector models are often based on technical solutions enabling public sector supply of services via applications (Janssen and Zuiderwijk 2014). The public-public actor or public-citizens partnership can be challenging for creating business value for private sector companies. Therefore, public sector support for private sector companies is important in knowledge and knowledge exchange to boost innovations (Love, Roper and Bryson 2011).

The identified barriers in public-private OI require models for creating successful open knowledge initiatives. Complexity in the different open knowledge adoption phases is manifested through various barriers to innovations (Attard et al. 2015; Smith and Sandberg 2018). Even though public sector agencies emphasize increased democratization, citizen empowerment and the transparency of public processes by digitalization in open knowledge-based innovation processes, the open knowledge exchange practices are old-fashioned (Zhenbin et al. 2020). However, to enhance open knowledge-based innovations, some crucial enablers for public-private OI that have been identified are policy drivers (McLoughlin et al. 2019), access to knowledge sources as well as private sector competence to utilize open knowledge and identify the benefits of open knowledge (Toots et al. 2017; Wang and Lo 2020).

4 CONCLUSIONS

This research explored the potential of public knowledge to spur open innovation via public-private partnerships. Previous studies highlighted knowledge's crucial role in fostering innovation. While open knowledge is vital for innovation and public participation, the private sector's significant contribution is often overlooked. Limited attention has also been given to the interplay between OI and open knowledge, potentially leading to a lack of shared understanding regarding OI's importance in public-private cooperation. Ecosystem models pinpoint crucial connections between agencies, but they don't yield benefits or income until these links translate into practical collaborations. Open knowledge exchange should not include identifiable information, as it's neither feasible nor sensible. Despite public organizations releasing anonymized or statistical knowledge, access and use by the private sector are frequently limited, especially in fields like healthcare. A more unified view of open innovation (OI) and the open knowledge ecosystem, alongside public-private collaboration, is crucial. The private sector's creation of open knowledge-based innovations, such as products or services, for private markets appears to have minimal influence. To better comprehend how the private sector can benefit from public open knowledge, additional empirical studies are crucial.

Challenges in innovation are widely explored in existing research. The next step should focus on developing models for successful open knowledge initiatives, including strategic planning (value realization and resource-based strategic analysis), technical enablers (new technologies as AI), sharing platforms (design of public knowledge sources with appropriate APIs), enabling functional public knowledge ecosystems, and legal frameworks to support open public knowledge exchange and utilization (e.g., knowledge privacy). We need to consider social aspects alongside technological and business ones. This includes management models for public knowledge and innovation, knowledge processes and its management to support OI, and organizational cultures that reflect experiences of control or safety, risk management, attitudes and engagement in OI processes. It would also be interesting research avenue to study the uncertainty,

complexity, ambiguity, and equivocality challenges related to knowledge (see e.g. Väyrynen et al. 2015) in public-private OI, as these may cause tensions in the collaboration.

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